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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/591,475	09/01/2006	Mitsuo Takashima	295882US0X PCT	1462

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EXAMINER	
SHEVIN, MARK L	

ART UNIT	PAPER NUMBER
1793	

NOTIFICATION DATE	DELIVERY MODE
06/02/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/591,475	TAKASHIMA ET AL.	
	Examiner	Art Unit	
	Mark L. Shevin	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09/01/2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *12/01/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status

1. Claims 1-11, filed September 1st, 2006, are pending.

Priority

2. Applicants' claim to benefit of Japanese patent application JP 2004-057379, filed March 2nd, 2004, has been recorded.

Information Disclosure Statement

3. The information disclosure statement (IDS) submitted December 1st, 2006 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement and has been considered by the examiner. Please refer to applicants' copy of the 1449 submitted herewith.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. **Claims 1-11** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Koike** (US 2002/0179207) in view of **Ibaraki** (JP 2000-337333 – machine translation – [full human translation coming soon]).

Koike:

Koike, drawn to a high-strength bolt having excellent delayed fracture resistance and stress relaxation resistance with a tensile strength of over 1200 N/mm^2 (Abstract), teaches producing a steel wire of the composition listed in the table below, with a total areal rate of pro-eutectoid ferrite, pro-eutectoid cementite, bainite, and martensite of less than 20% with the remainder as pearlite (para 0008).

Element(s)	Koike	Instant Claim 1	Overlap
C	0.5 - 1	0.5 - 1	0.5 – 1
Si	0 < 0.5	0.55 - 3	none
Mn	0.2 – 1.0	0.2 - 2	0.2 – 1
P	0 < 0.03	0.0001 – 0.03	0 < 0.03
S	0 < 0.03	0 < 0.03	0 < 0.03
Al	0.01 – 0.05	0 < 0.3	0.01 – 0.05
Cr	0 - 0.5	0 < 2.5	0 - 0.5
Co	0 < 0.5	0 < 0.5	0 < 0.5
Ni	0 < 1.0	0 < 1.0	0 < 1.0
Cu	0 < 0.5	0 < 1.0	0 < 0.5
Mo, V, Nb, Ti, W	0 - 0.3	0 < 0.5	0 < 0.3
B	Not stated	0 < 0.003	n/a

The steel wire is formed into a bolt by wire-drawing the steel (para 0015), cold heading the wire into a bolt shape (para 0021) and then blueing in the range of 100 – 400 °C to increase the bolt strength and improve the proof stress ratio and relaxation resistance (para 0020).

Koike does not teach the content of silicon in the claimed range of 0.55 – 3 wt% but does teach that the beneficial effects of Si (improving hardenability, deoxidation, and solid-solution strengthening) all improve with increasing Si content, but at the expense of ductility (para 0026).

Ibaraki:

Ibaraki, drawn to a high-strength bolt with excellent delayed fracture resistance and a tensile strength of over 1200 N/mm^2 (Abstract), teaches such a bolt as having proeutectoid ferrite, free cementite, bainite, and martensite phase fractions controlled to under 20% with a remainder of pearlite (Abstract and para 0007).

Ibaraki teaches that it is necessary to control the generation of proeuctectoid ferrite, free cementite, bainite, and martensite as much as possible, especially below 20% and to make pearlite greater than 80% (para 0012).

The alloying additions and their differences between the prior art and the instant claims are presented in the table below:

Element(s)	Ibaraki	Instant Claim 1	Overlap
C	0.5 - 1	0.5 - 1	0.5 – 1
Si	0 < 2	0.55 - 3	0.55 – 2
Mn	0.2 – 1.0	0.2 - 2	0.2 – 1

P	0 < 0.03	0.0001 – 0.03	0 < 0.03
S	0 < 0.03	0 < 0.03	0 < 0.03
Al	0.01 – 0.05	0 < 0.3	0.01 – 0.05
Cr	0.01 - 0.5	0 < 2.5	0.01 - 0.5
Co	0 < 0.5	0 < 0.5	0 < 0.5
Ni	0 < 1.0	0 < 1.0	0 < 1.0
Cu	0 < 0.5	0 < 1.0	0 < 0.5
Mo, V, Nb, Ti, W	0.01 - 0.5	0 < 0.5	0.01 - 0.5
B	0.0005 – 0.003	0 < 0.003	0.0005 – 0.003

With respect to silicon content, Ibaraki teaches that Si raises the hardenability, deoxidizes the metal, dissolves into ferrite to solid-solution strengthen the steel, and suppresses the deposition of free cementite. The content should be kept below 2.0 wt% to kept the ductility from falling too low for wire drawing (para 0018).

Regarding claim 1, it would have been obvious to one of ordinary skill in metallurgy, at the time the invention was made, taking the disclosures of Koike and Ibaraki as a whole, to form a high-strength bolt of steel as claimed and to modify Koike to include more Si as taught by Ibaraki as both Koike and Ibaraki teach Si as a valuable element in terms of increasing mechanical properties but differ only what they consider as the maximum level acceptable for ductility purposes. Ibaraki teaches that it is hard to cold forge the bolt (para 0039) but does not preclude the process because of the high Si

content. One of ordinary skill would be motivated to use a higher Si content as Koike in particular teaches that the beneficial effects increase with added Si content.

Regarding claims 2-5, 7, 8, and 10, both Koike and Ibaraki teach steel compositions with alloying additions that fall in the instantly claimed ranges. It would have been obvious to one of ordinary skill in the art at the time of the invention to choose the instantly claimed ranges through process optimization, since it has been held that there the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980). MPEP 2144.05, para I states: "In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists."

Regarding claims 6 and 9, Ibaraki teaches limiting the boron content to a maximum of 0.0025 wt% (para 0025) to improve the hardenability of the steel while prevent toughness from degrading and it would have been obvious to incorporate the boron content of Ibaraki in the bolt of Koike for the reasons stated by Ibaraki.

Regarding claim 11, Koike teaches that the balance of the steel composition in the bolt is substantially Fe with inevitable impurities such as O (para 0038).

Conclusion

-- Claims 1-11 (All pending) are rejected
-- No claims are allowed

The rejections above rely on the references for all the teachings expressed in the text of the references and/or one of ordinary skill in the metallurgical art would have reasonably understood or implied from the texts of the references. To emphasize certain aspects of the prior art, only specific portions of the texts have been pointed out.

Each reference as a whole should be reviewed in responding to the rejection, since other sections of the same reference and/or various combinations of the cited references may be relied on in future rejections in view of amendments.

All recited limitations in the instant claims have been met by the rejections as set forth above. Applicant is reminded that when amendment and/or revision is required, applicant should therefore specifically point out the support for any amendments made to the disclosure. See 37 C.F.R. § 1.121; 37 C.F.R. Part §41.37 (c)(1)(v); MPEP §714.02; and MPEP §2411.01(B).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark L. Shevin whose telephone number is (571) 270-3588. The examiner can normally be reached on Monday - Thursday, 8:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark L. Shevin/

/Roy King/

Supervisory Patent Examiner, Art Unit 1793

10-591,475
May 20th, 2008